

A Non-parametric Bootstrap Simulation Study in ESTAR (1) Model

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ABSTRACT

Smooth Transition Autoregressive (STAR) model has been employed in a number of current studies dealing with non-linearities. The usefulness of this model has been documented in these studies. However, the population statistical properties of the parameters in this model remain unknown. This study attempts to investigate these properties through a non-parametric bootstrap simulation study. The exponential STAR model of order one, which is sufficient in providing us the necessary information on the linear and non-linear parameters as well as the speed of transition of the STAR model despite its simplicity, is employed in this study. This study also investigates the size effect of the bootstrapped estimators and their confidence intervals by varying the number of bootstrap replications. Results of this study show that their empirical distribution are asymmetrical in nature with the linear parameter being positively skewed and the non-linear and transition parameters being negatively skewed. Besides, we find that the normality theory over rejects the significance of the estimated transition parameter. Another interesting point worth mentioning is that the minimum number of replications needed for the bootstrap confidence interval to be a good approximate of the standard normal one is 500.

Keywords: non-parametric bootstrap, ESTAR model, confidence intervals, statistical distribution